Jadavpur University
Department of Computer Science and Engineering

NETWORKS LAB ASSIGNMENT 6

BCSE UG-III

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Assignment 6

This report summarizes my Cisco Packet Tracer simulations and validations for all seven tasks (back-to-back link, LANs with hub/switch, interconnection, two routed LANs with static routes, DHCP integration, and a LAN with DHCP–DNS–Web–FTP). Each answer begins with the relevant screenshots placed *before* the text, with minimal spacing.
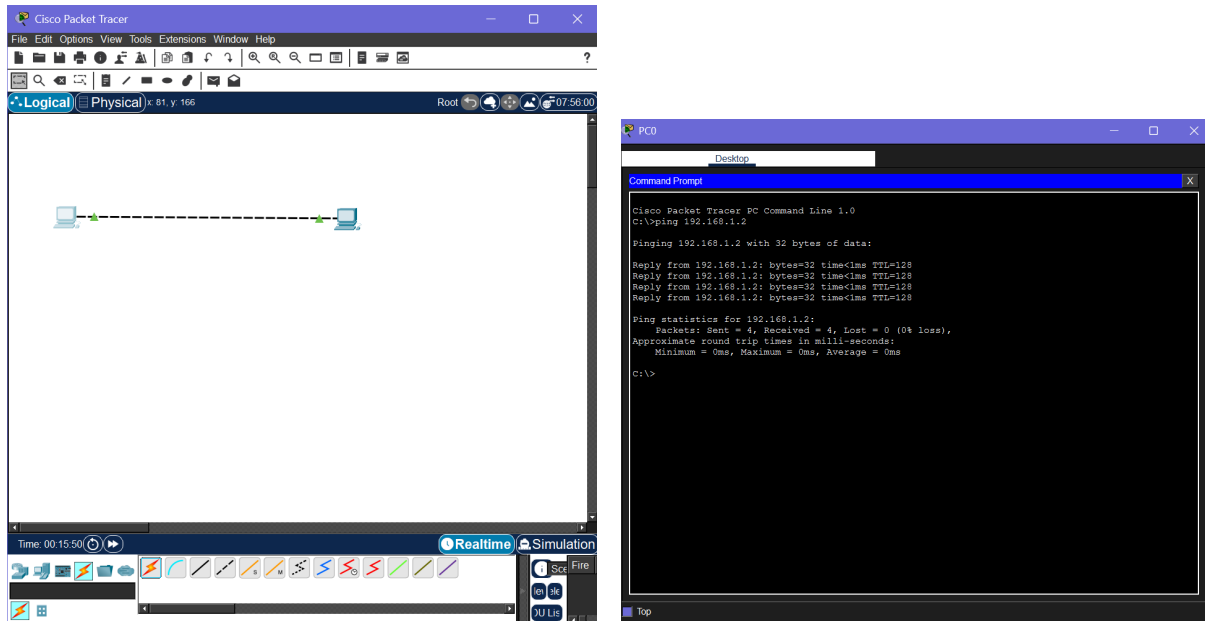
Q1. Back-to-Back Connection

Figure 1: Q1: Direct crossover wiring, addressing, and successful ping.

I connected two PCs directly with a **crossover cable**. I set the IPs to 192.168.1.1 and 192.168.1.2 (/24). The ping test from one host to the other succeeded, confirming end-to-end connectivity.
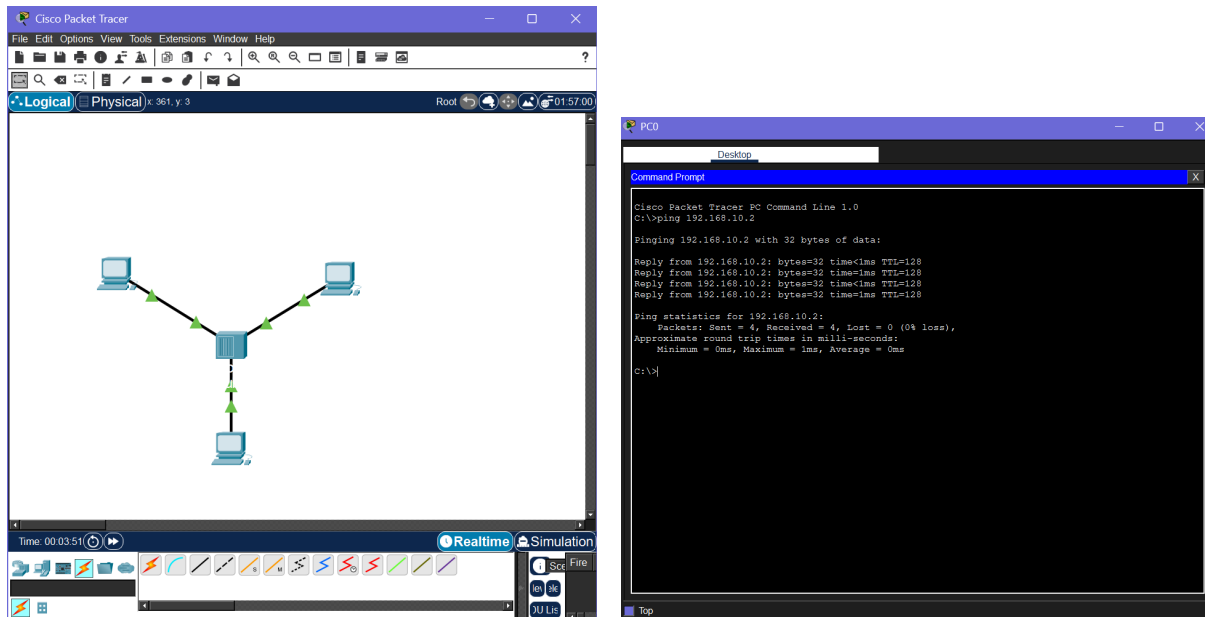
Q2. LAN-A with Hub
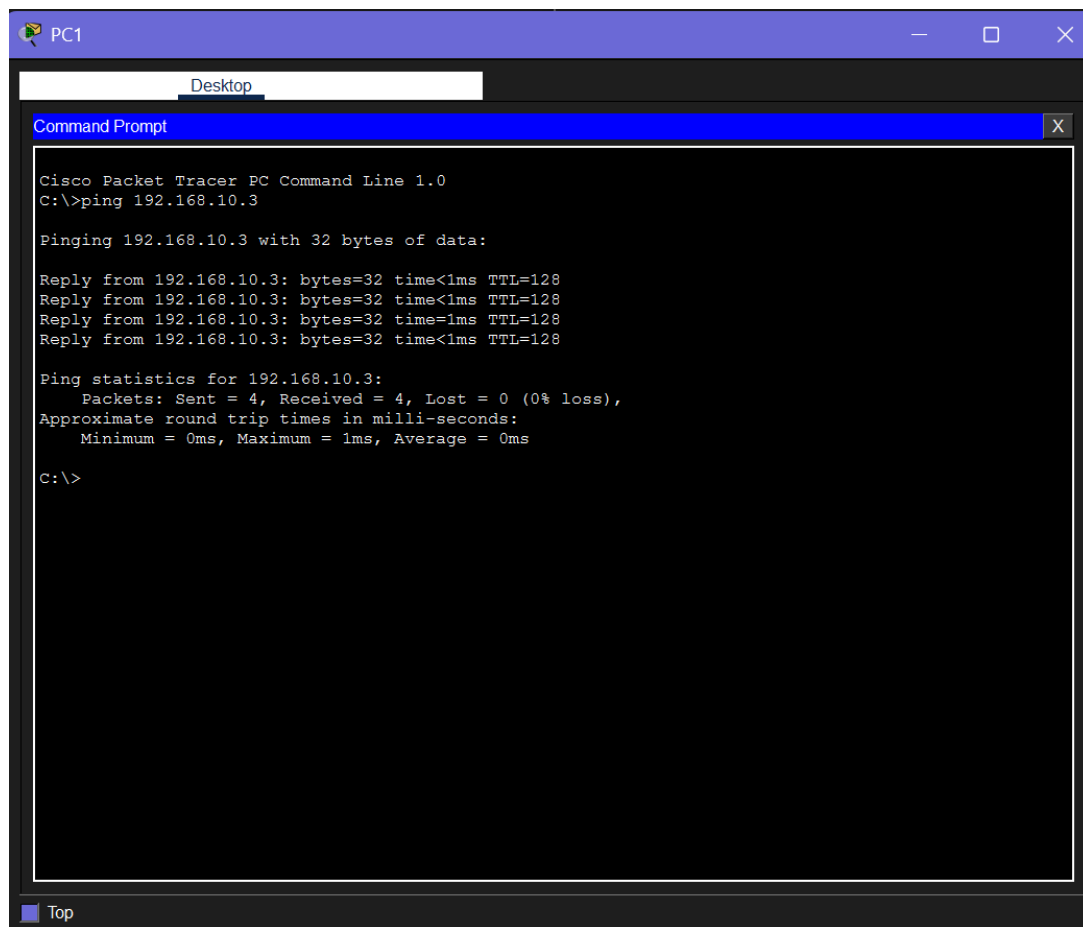

Figure 2: Q2 (topology & addressing 1/2).

Figure 3: Q2 (ping matrix 2/2).

I built **LAN-A** using a hub and straight-through cables. I assigned 192.168.10.1, .2, and .3. Pings between every pair of nodes succeeded, as expected for a shared-collision medium.

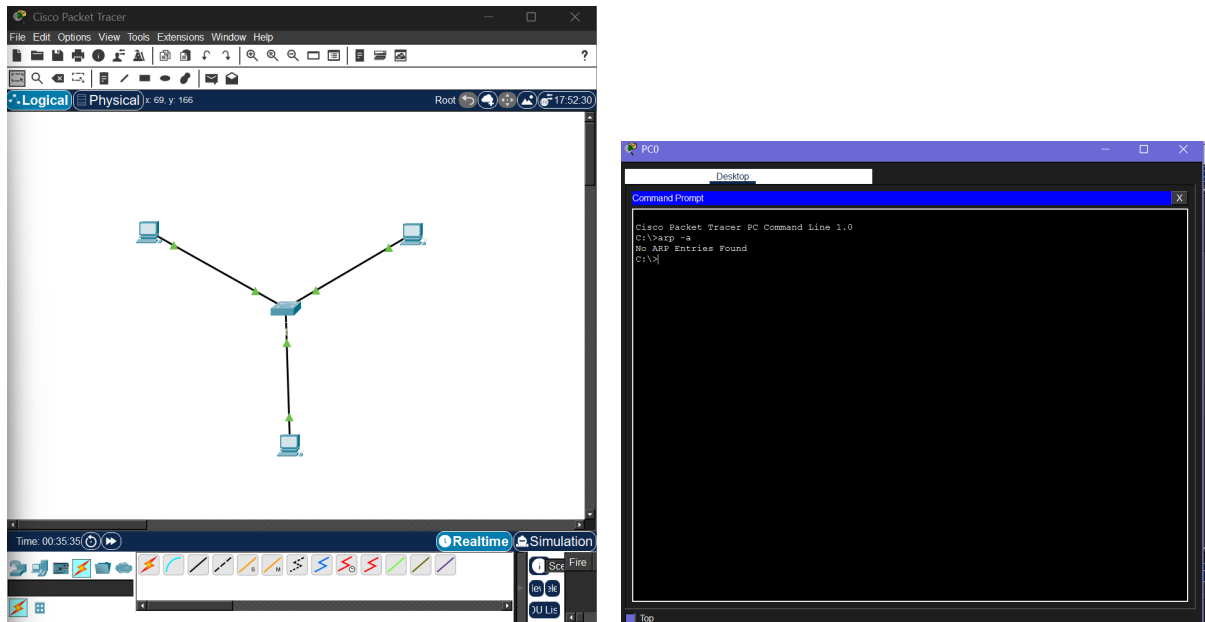## Q3. LAN-B with Switch (Before/After Ping Tables)

Figure 4: Q3 Before Ping (1/2): Host ARP table empty; switch MAC-table baseline.
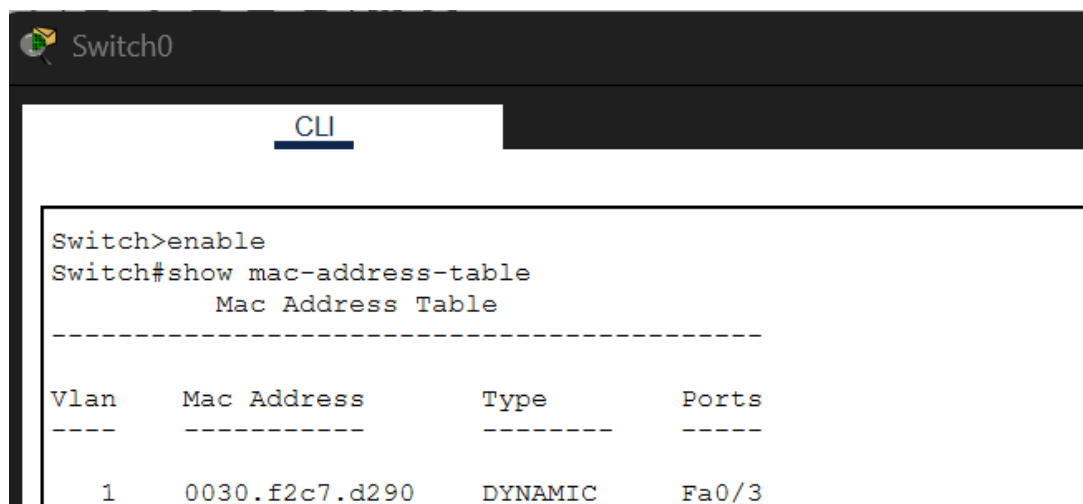

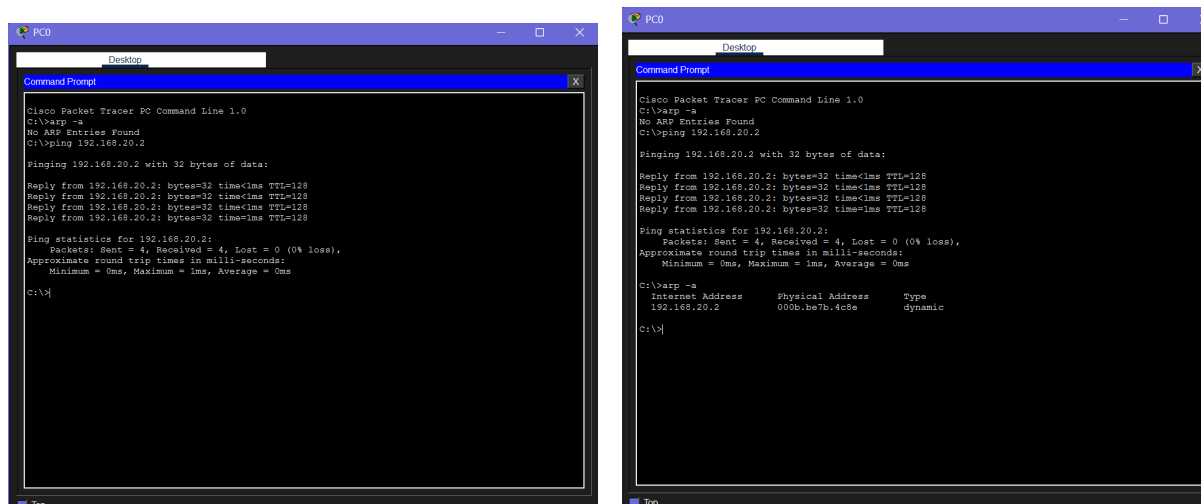Figure 5: Q3 Before Ping (2/2): No dynamic MAC entries yet.

Figure 6: Q3 After Ping (1/2): ARP populated on hosts.


```
Switch#show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.9691.bc8e    DYNAMIC     Fa0/1
   1    000b.be7b.4c8e    DYNAMIC     Fa0/2
Switch#
```

Figure 7: Q3 After Ping (2/2): Switch learned port–MAC mappings.

I created **LAN-B** on `192.168.20.0/24` using a **switch**. Before any traffic, both the host ARP tables and the switch's MAC table were empty. After I pinged from one host to another, ARP entries appeared on the hosts and the switch *learned* the source MACs, showing dynamic entries per port.
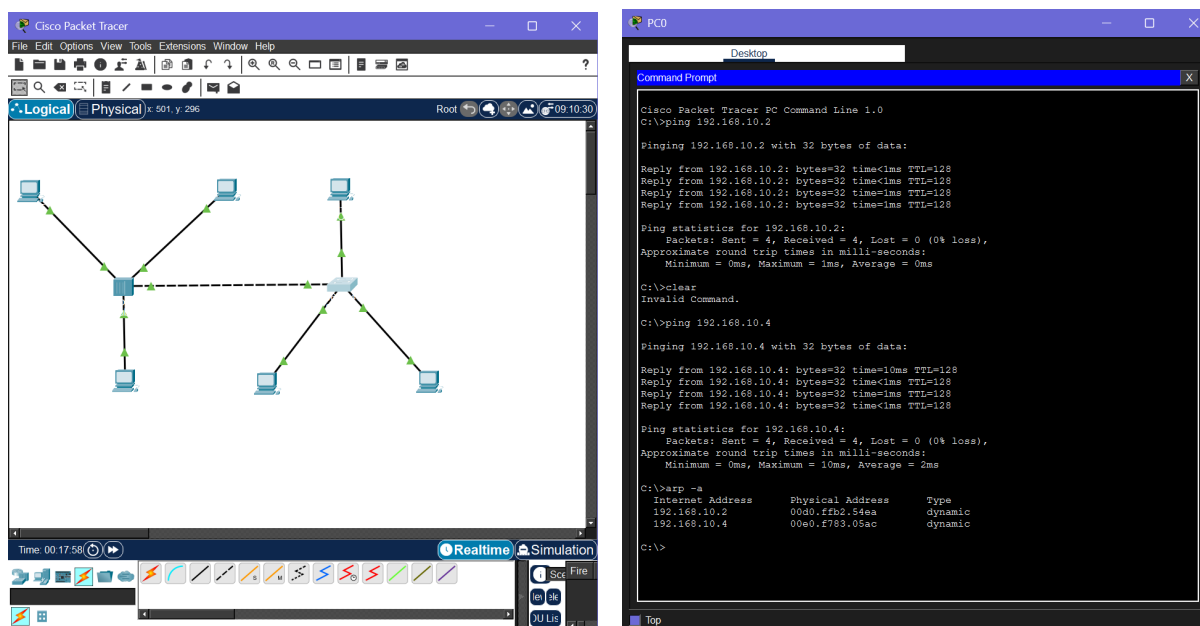
Q4. Connecting LAN-A and LAN-B

Figure 8: Q4 (1/2): Hub–Switch crossover and unified subnet.

Figure 9: Q4 (2/2): End-to-end pings across both segments.

I reconfigured all six hosts onto the same subnet 192.168.10.0/24 (.1–.6) and linked the hub and switch using a **crossover cable**. Pings across the two segments succeeded. On the switch, MAC entries for the three hub-side PCs appeared behind the *single* uplink port—illustrating that a hub forwards all frames out all ports.
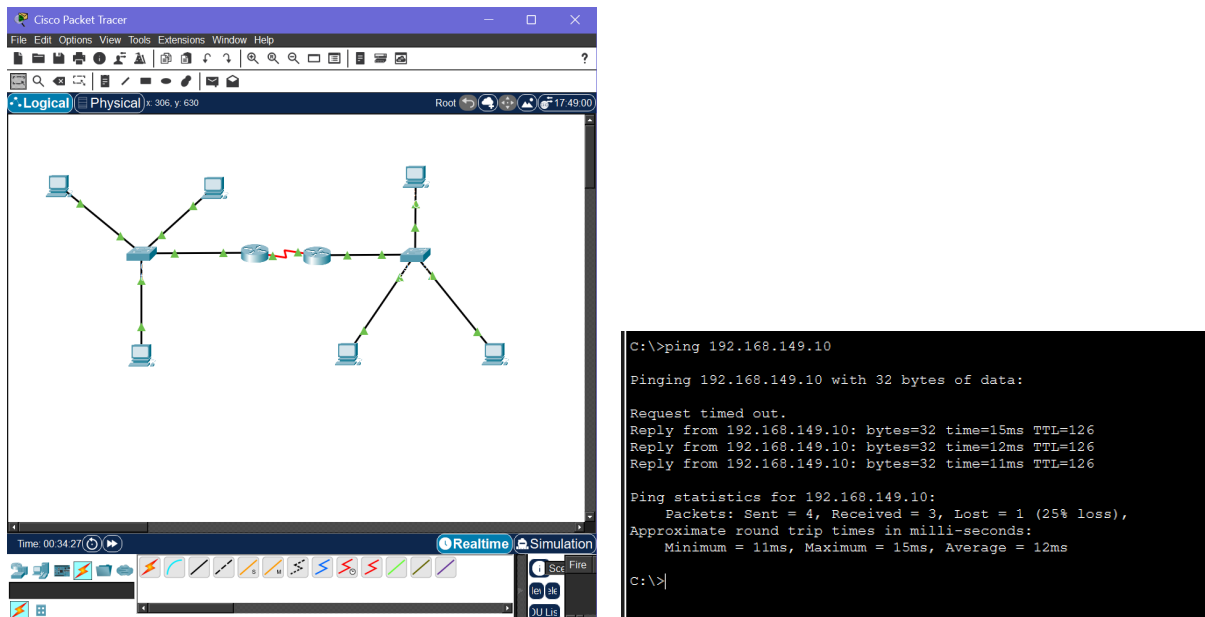
Q5. Two LANs with Routers (Static Routing)

Figure 10: Q5: JU-Main (`192.168.148.0/24`) and JU-SL (`192.168.149.0/24`) via routed WAN `192.168.150.0/24`; static routes configured.

I built two routed LANs:

1. **JU-Main LAN** on `192.168.148.0/24` with a 2950 switch and a router (`Fa0/0 = 192.168.148.1`). Each host's default gateway points to `148.1`.

2. **JU-SL LAN** on `192.168.149.0/24` with its own switch and router (`Fa0/0 = 192.168.149.1`). Hosts use `149.1` as the gateway.

3. I added `WIC-2T` modules and connected the routers over a serial link on `192.168.150.0/24`.

4. I configured **static routes** on both routers so that `148.0/24` and `149.0/24` could reach each other via the `150.0/24` WAN.

End-to-end pings between JU-Main and JU-SL hosts were successful.
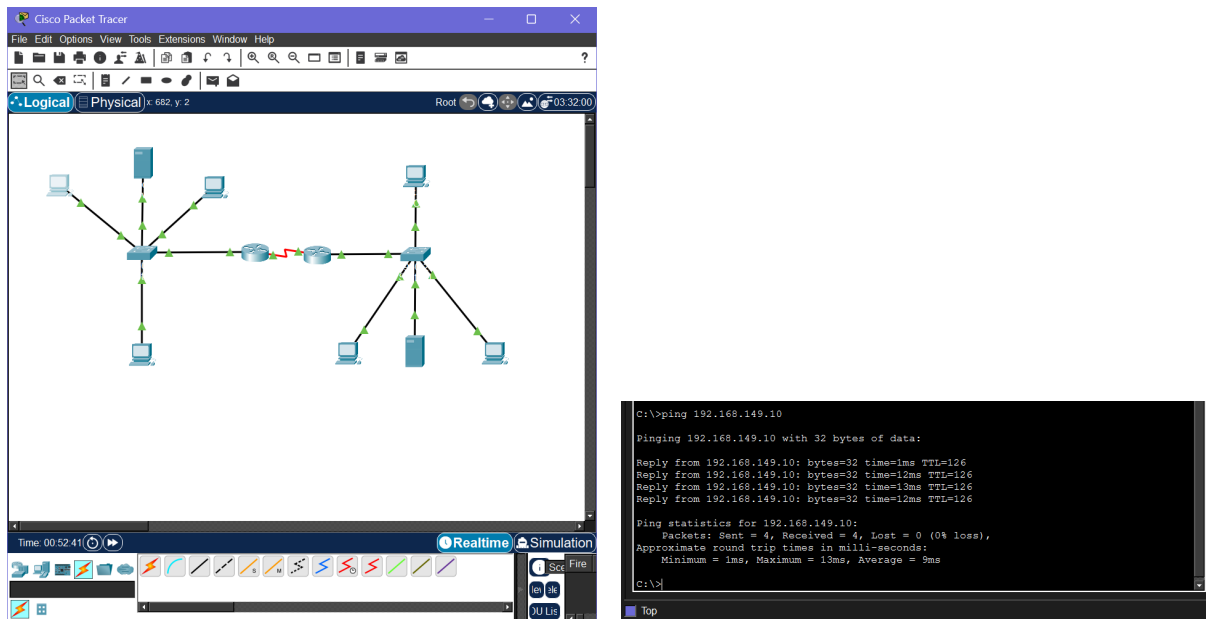
Q6. Adding DHCP Servers to Each Routed LAN

Figure 11: Q6: DHCP servers per LAN; PCs switched to DHCP and successfully leased IPs and gateways.

On the **same topology** as Q5, I placed one server in each LAN and enabled the DHCP service:

- JU-Main server leases addresses and default gateway for `192.168.148.0/24`.

- JU-SL server leases addresses and default gateway for `192.168.149.0/24`.

I set all six PCs to *DHCP*; each successfully obtained an address and the correct default gateway from its LAN's server.

Q7. LAN with DHCP, DNS, Web, and FTP (CSE)

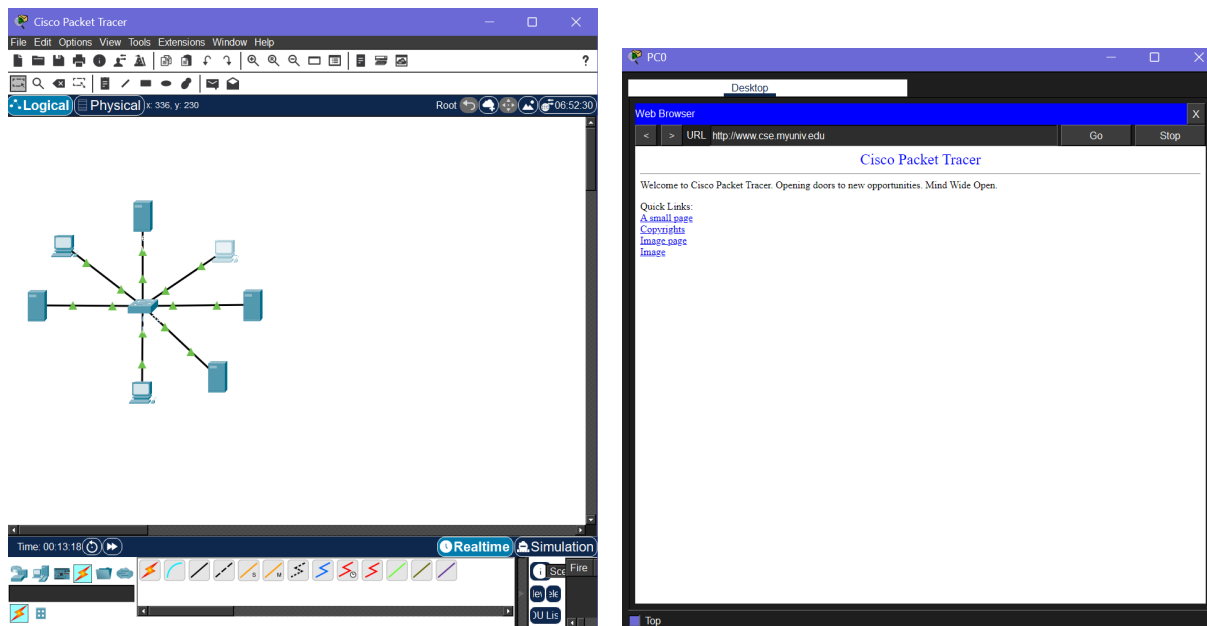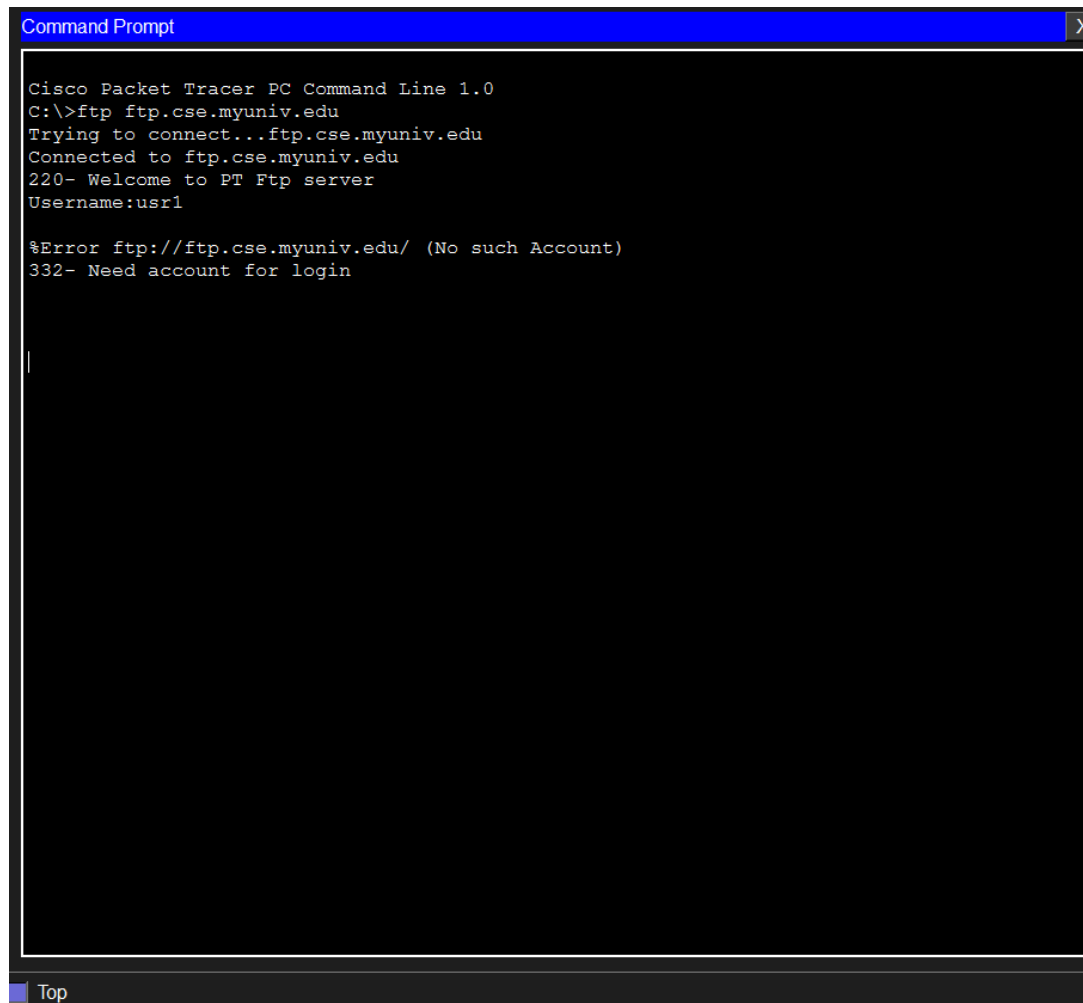Figure 12: Q7 (1/2): CSE LAN servers and DHCP scope including DNS option.

```
Command Prompt                                                          X

Cisco Packet Tracer PC Command Line 1.0
C:\>ftp ftp.cse.myuniv.edu
Trying to connect...ftp.cse.myuniv.edu
Connected to ftp.cse.myuniv.edu
220- Welcome to PT Ftp server
Username:usr1

%Error ftp://ftp.cse.myuniv.edu/ (No such Account)
332- Need account for login



|
```

Top

Figure 13: Q7 (2/2): Clients resolve and access services via `cse.myuniv.edu`.

I built a **CSE** LAN with one switch, three hosts, and four servers (DHCP, DNS, Web, FTP). I assigned *static* IPs to the servers. On the DHCP server, I included the **DNS server address** in the scope options so clients automatically learned it. On the DNS server, I created `A` records for the Web and FTP servers under the domain `cse.myuniv.edu`. I set all three PCs to obtain IPs via DHCP; they received the expected IP configuration and DNS server. From a PC browser, I successfully opened the website using the domain name `www.cse.myuniv.edu`.